

Environmental Health Needs In a Dynamic Society

By MARK D. HOLLIS, C.E.

When we speak of a healthful environment, we think mainly of safe, wholesome, palatable water, of a healthful diet, of clean air, and of shelter for our families where they live, and work, and rest.

The need for a healthful environment is common to all peoples: it cuts across boundaries of occupation, race, class, and politics. If it differs from neighborhood to neighborhood, and from region to region, it differs not in fundamentals but only in complexity.

Today, our Nation's needs for environmental health services are the most complex in history because of the environmental changes created by economic and technological advances. The job today for environmental services is to keep up with, or ahead of, total historical trends.

If we do not keep ahead of some of these changes, we may be obligated to suffer them indefinitely. Already we are dangerously behind the trend in water pollution. In communities like Los Angeles, will people continue to suffer from polluted air?

Are we committed to live with a scandalous number of home and highway casualties?

Are we endangering future generations by our increasing exposure to ionizing radiations?

We have come a long way since Benjamin Rush attacked filth in Philadelphia. A century ago, we were obliged to advance the techniques of sanitation by a trial and error process.

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Shortly thereafter scientific studies began the identification of microbes, leading to the modern life-saving techniques of pasteurization and chlorination. Since then, also, teams of health workers have organized effective attacks upon a host of disease vectors. Equally significant studies prepared the ground for the chemical approach to nutrition.

Today, the Nation aims to carry on what has been begun so well. Also, we are beginning to explore relatively new worlds: the viruses, fungi, and pollens; the effects of noise, radiations, dusts, temperature, humidity, and other physical forces; the environmental needs of an aging population; nutritional and other environmental factors in chronic disease; methods for reducing the appalling toll of home accidents; and the biological effects of penetration of the environment by commercial chemicals.

The feed-back process creates new problems as rapidly as old ones are solved. The chemicals used to control vectors, for example, may themselves become environmental hazards. Radiations used to sterilize sealed foods, an imminent development, may themselves be hazards in the working environment.

The outstanding historical trend is the increasing rapidity and continuing complexity of environmental change. Though we may realize that industrial production has increased sevenfold since 1900, it is difficult to sense the significance of the fact that half of this increase has come within the past 10 years. The speed of progressive technology has tossed us far out onto uncharted waters. From here on, we travel without precedent. We must review our

health programs constantly and adjust them frequently to keep in pace with the times.

Our Resources

Our 300-billion-dollar productive capacity assures the ability to provide essential environmental services. We have the material resources, the knowledge, and the techniques with which to train personnel. We have also a respectable body of capital equipment for water and sewerage systems, for food processing, for shelter of all kinds, and for laboratory experiments. Public water supply systems serve more than half the population, and they serve 90 percent of the families in the areas where they are installed. About 90 percent of fluid milk on the market is pasteurized. Even though specific deficiencies remain, we have unquestionably the greatest per capita investment in the world in a healthful environment.

Our institutional resources are equally valuable. With the collaboration of private institutions, we have formed the core of a successful team of Federal, State, and local public health agencies. The present pattern of administering public health programs assures flexibility and opportunity to experiment and to diversify. At the same time, it makes possible the development and use of uniform standards, equipment, or methods, once the advantages of uniformity are fully realized.

Health departments, to be sure, have not engaged directly in every field of environmental health service: often services are managed as commercial or mechanical functions and sometimes with little regard for their relationship to public health.

Current Needs

Our paramount need is to recognize that a healthful environment is a basic social objective. Such recognition should be established not only among professionals but also among the general public. It is not merely a matter of securing funds to support health work. Funds now available are not always spent as well as they should be—where there is no appreciation of prime health objectives.

Where health is a major objective, money can be used to anticipate future health problems. It is not necessary to delay action until there is a

clear and present danger. Professional health workers usually know the need for environmental services years before public opinion and public officials support such services.

Widespread recognition of health objectives may also help to extend participation in health activities to persons outside the public health profession. Environmental health services have grown so complex that they can no longer be managed exclusively by a handful of public health employees—a mere 8,500 engaged in sanitation work in all State and city health departments. Active collaboration must come from physicians, engineers, farmers, food handlers, builders, and city planners, to name but a few of the professions and trades concerned.

Traditionally, health work has been negative: it has aimed to prevent disease rather than to promote health.

We are in a position today to conceive of health in positive terms. We can define healthful living conditions, and we can work toward such conditions.

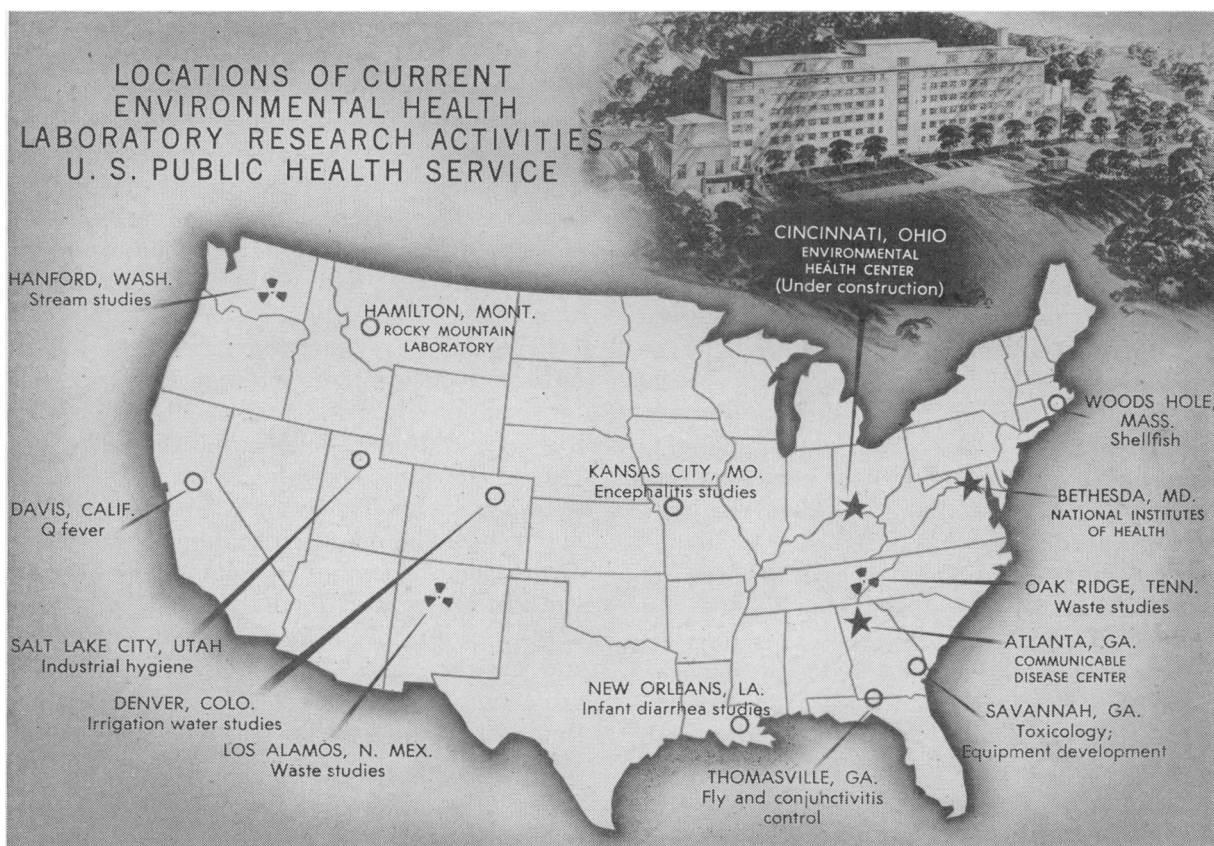
For example, it would have been good engineering and good economics, too, if we had worked as hard to secure and protect clean raw water as we have worked to treat polluted water. The positive concept applies to housing, dental health, and to other fields. The positive concept of health may be the decisive difference between environmental health work as we have known it and as we may see it in the future.

As we consider specific fields for positive action—air, water, food, and shelter—it would seem we have two simultaneous tasks. One is to increase progress in established fields. The other is to probe the unknown, to probe new problems, and to develop new instruments and new tactics.

In recent years, there has been a tendency for environmental services to remain static. This tendency results partly from the hypnotic effects of routine, partly from the failure to value these public health services as highly as personal health services, especially for certain chronic diseases, and partly from indifference to obsolescence of practices and equipment.

Air

Although, pound for pound, our intake of air is 10 times as much as our intake of water, the



—From "Environment and Health," Public Health Service Publication No. 84, 1951.

atmosphere is one of the relatively neglected fields of public health. Presumably, different atmospheric standards would apply to the kitchen, laundry, and nursery; to the school and the factory; to the city and the country. But we don't know what they should be. Meanwhile, we have observed the discomfort of 4 million victims of hay fever; the chronic irritation in Los Angeles; the deaths, notably among the aged, in Donora; and specific lung diseases, such as silicosis and lung cancer, in certain industrial areas. We have seen that a polluted atmosphere attacks not only the lungs but also the skin and eyes. Atmospheric chemicals enter the blood stream also and produce secondary organic effects.

In this field, there is a need for more and better standards; legislation and administrative organization; a better knowledge of the contents of the atmosphere, of the techniques of regulating atmospheric conditions, and of the chronic effects of low-level exposure to impurities. What all this will cost, no one can say,

but it is not likely to cost as much as the present losses that result from dust, corrosion, illness, and other effects of atmospheric pollution.

There is need also to strengthen determination to act in the presence of alarming changes in the natural environment before all the evidence is in. This policy is needed to deal with radioactive dusts and with germs or poison gases which may enter the air, whether by accident or design, as well as with the more familiar hazards. We can't afford to postpone corrective action until all scientific questions have been answered.

Water

Although the highest use of water in our society is to relieve thirst, its other uses are equally essential. For this reason, we have come to feel it has been a basic error to separate the need for a safe drinking water supply from the need to prevent gross pollution of the raw water source. The tendency today is to approach the development and utilization of

the water resource as a unit. Water is a factor in nutrition, dental health, waste disposal, shelter, atmospheric conditioning, radiation exposure, recreation, and in industrial production.

The need to maintain and extend basic water services is unrelenting. We should extend the public supply lines to the 10 percent of the population living in settled areas which are not now served. Seven million homes need to be supplied with running water. Water-carriage systems of waste disposal are needed in an even greater number of homes. Four million rural families need new or improved water sources.

There is need also to reclaim water in polluted sources; to abate pollution now entering streams, lakes, and harbors; to extend the practice of fluoridation; and to improve techniques for managing certain trade wastes. There is a need also to modernize techniques.

There is need to anticipate expanding demands and uses of water. The economy may be expected to grow at a rate of 3 percent a year. It is predicted that, by 1975, output will be double the level of production in 1950. The Census Bureau estimates a population of 193 million in 1975, with a working force of 82 million. The work week is expected to be 15 percent shorter. And labor productivity is expected to rise 2.5 percent annually. These figures all suggest increases in both the total and per capita level of consumption of goods and services.

The backlog of proposed water works construction projects is estimated at \$1.4 billion. The backlog of sewerage projects proposed is put at \$2.4 billion. This backlog does not contain all projects needed to anticipate future needs arising from the growth of population and production. A 10-year program of investment in treatment facilities for municipal and industrial wastes is estimated to run from \$9 to \$12 billion.

Food

Unless there is danger of infection or poisoning, it is usual to think of food as a commodity. Environmental services have applied to the food environment rather than to the food itself. But with the development of a positive view towards health, the tendency is to think of food less as a commodity and more as an essential to

health. This tendency was accelerated by the experience of England during the war years. There the general level of nutrition was improved despite a decline in the total quantity of food available. American concern with the quality and quantity of diet and its availability began with isolation of the vitamins and with Goldberger's pellagra studies. The extent of malnutrition 20 years ago intensified this concern.

Economic developments since 1941 seem to have turned the tables: for Americans, the major food problem today seems to be obesity. Deficiency diseases—pellagra, beriberi, and rickets—have become relatively rare. But we still lack a sound index of where we stand on nutrition. The practice of adding vitamins to certain foods is a voluntary act by the processor.

Efforts to protect food from contamination have been aimed chiefly at certain organisms and their toxins. The need to apply such protection to public eating places is chronic. But we have little of the knowledge needed to control chemicals in food. The select committee of the House of Representatives to investigate the use of chemicals in food products (H. R. Res. 323, 81st Cong.) states there are 704 chemicals used in food, and only 428 are known to be safe. Some chemical additives, in appropriate amounts, are beneficial, as are fluorides, iodine, or vitamin D. But others may bear further investigation. A Federal food board has been suggested to rule on the safety of using chemical additives.

The need for uniform regulations, uniformly administered, has been noted particularly in the food industry. Fortunately, the milk industry and public authorities have developed a co-operative program which seems likely to facilitate the movement of milk across State lines. Uniformity is expected also to achieve major economies in the design, manufacture, and use of equipment.

Shelter

Our concept of shelter was once limited to a roof and four walls, but this concept has broadened to the belief that environmental services focus upon the health of the family in the home, and that the safeguards applied at the

water works, the factory, the school, the office, or the dairy are simply extensions of the family roof.

In practice, decent shelter provides a potable supply of water, sanitary disposal of sewage and garbage, healthful atmosphere and temperature, and good lighting; quiet and privacy; enough space for safe movement, for storage, and for play; screening and other protection against pests or disease carriers; safe, fireproof design and construction; and reasonable access to community facilities in an orderly neighborhood. These are rough specifications of what is meant by the national housing policy approved by Congress, stating that "the health of the people . . . requires a decent home and a suitable living environment . . . for each American family"—(Public Law 171, 81st Cong., 1st sess.).

Despite this policy, and despite a prodigious record of building in the past 5 years, one-third of the Nation's dwellings today have one or more basic health defects. As noted above, 7 million dwellings lack running water. Only half of these are in farm areas. Another 7 million lack hot running water. Almost 7 million dwellings are overcrowded. Almost 13 million dwellings lack decent toilet facilities, and only a third of these are in farm areas. More than 12 million have no shower or bathtub, and less than half of these are on farms.

Before the discovery of microbes, health departments actively enforced minimum standards of health and sanitation in housing, because they recognized that these were their best defenses against disease. A short-sighted notion that germs could be controlled without sanitation tended to discourage this activity. Another reaction against sanitation occurred as a result of the use of DDT and other chemicals. A few enthusiasts began to think that disease-carriers could be controlled chemically without sanitation measures. They have since learned that they were wrong.

The current housing shortage has encouraged progressive health departments to apply enforcement measures to improve the supply of decent shelter. Baltimore, Los Angeles, and Milwaukee are among more than 40 cities with programs under way. Health departments in at least 40 other cities have initiated programs.

Such programs could add 500,000 decent units a year to the present supply for over 30 years.

Builders and real estate operators are giving this movement their support. Public health officials, recognizing that private building and public housing cannot satisfy the total demand in all income brackets for decent homes, can contribute outstandingly to this one phase of the shelter problem. There is a need to apply the standards of decent shelter also to the facilities used by a million migrant workers and by other transients.

Personnel and Training

A review of personnel and training must consider that environmental services are not the private domain of a single profession exclusively. The health team has replaced the individual professional in health practice. But even in the team, we look to the individual leader. Leadership is given to the personality with the capacity and competence. It is not a professional monopoly.

The need for broad-gauge men and cooperative relations with those in related fields is indicated by our industrial growth. Our economic future depends upon the determination of industrial engineers and health workers to keep the byproducts of modern technology under control.

The emerging problem of ionizing radiations appears to be one mainly of organizing competence in local and State health departments. Their responsibilities in the atomic age are suggested by the growth of the facilities of the Atomic Energy Commission and the concomitant use of radiations in private industry. Health departments will soon require the knowledge and training to protect this generation, and future generations, from the consequences of excessive exposure. Meanwhile, there is a great need to establish programs to evaluate radiation exposure and to develop protective practices.

Research

To overemphasize the importance of broad, popular understanding of the environmental conditions fundamental to public health would be difficult. Perhaps the development of a broad understanding should be a phase of ad-

ministrative research. The key to this need may be that the man at the desk seldom takes the total health needs as seriously as he takes the water supply in his own kitchen. It is difficult to stir him with the fact that accidents in the home are the leading cause of death in children. Chronically, he takes the view that home accidents happen to somebody else, until they happen to him. There is a need to know how such a personal view of public health can be broadened.

Other research needs—the need for modern techniques of operation and management, and the need for modern procedures for evaluating health conditions and techniques—have been mentioned previously in relation to specific operations.

However, one relatively untouched but important field of research is the study of the relationship between health and total economic prosperity. On the one hand, we need to know what health services the economy can afford. On the other, we need to know how much environmental controls contribute to the expansion of the economy. It would be useful to know on what terms our resources could assure a decent home for every family. It would be useful also to measure the effects of health on the productivity of the working population or the cash advantage realized from industrial uses of water. Both industry and the public may benefit from such studies. With such knowledge, we may find it possible to raise health standards substantially.

For water pollution control particularly, there is a need for continuous, automatic monitoring instruments, such as we have developed for measuring radiations. New kinds of measuring instruments are needed too, because the character of pollution has changed in recent years. The development of these instruments obliges us to inquire whether the expense and complexity of the operation is justified, but generally any machine may be used in repetitive operations to advantage. There is a need to develop techniques for removal of specific pathogens from water and for removal of organic chemicals and radioactive substances. There is need for a major shift in emphasis from the simple disposal of waste material to its capture and conversion into useful commercial prod-

ucts. This need is the more urgent in view of the depletion of certain nonrenewable resources and the importance of organic fertilizers. This need will grow with time.

If it is agreed that environmental research seeks practical applications rather than basic knowledge, then it is important to evaluate both research and operations in terms of the ends we seek. Such evaluations would determine whether our efforts are meeting their objectives. They would provide a solid basis for planning. And they would tell us whether we are developing techniques and facilities to deal with predictable developments.

Summary

Environmental health services today need greater recognition to enable the Nation to adjust to the demands of a rapidly changing environment. Recognition may come if the public learns to associate personal needs in environmental services with the public need. Recognition may be improved also by open efforts to advance and extend familiar services, and to develop future services.

The four fundamentals of environment—air, water, food, and shelter—in the United States right now present a complex assembly of inter-related needs. In each field there are the recurrent needs of administration, personnel, research, and positive concepts.

To look ahead, it appears a certainty that our hopes and objectives for public health are bound to be integrated with public policy as a whole, our economic development, our role in world affairs, our social institutions, and our common hopes and aspirations.

The pessimists among us are convinced that society is about to enter a new eclipse of ignorance and darkness. The optimists are confident that the golden age is around the corner. One must be a realist; one must recognize the complexities and difficulties of this period of transition and still endeavor that, with no problems completely resolved, we shall use our technical powers so that the next generation will still have grounds to feel confidence and pride in its health services. We have reason to hope that, within the next 20 years, the Nation need not suffer neglect of the environment of any family, any neighborhood, or any community.